DETAILED ACTION

Response to Arguments

1. Applicant's arguments with respect to claim 11-20 have been considered but are moot in view of the new ground(s) of rejection.

2. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

Claim Rejections - 35 USC § 103

3. Claims 11-13, 15-20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Landsman et al (US 5,480,735) in view of Quinn et al (Journal of Membrane Science 131 1997 49-60) and Herman et al (Journal of Membrane Science 218 2003 147-163).

Landsman et al disclosed an alkaline fuel cell comprising two electrodes (anode 1 and cathode 2) each with active layers (figure 2). As known in the art, a membrane must be present to separate the reactants from the alkaline solution. The disclosure of Ladsman et al does not teach the nature of the hydroxide conducting element.

Quinn et al studied membranes based on polyelectrolyte poly(vinylbenzyltrimethylammonium fluoride) (PVBTAF). PVBTAF is selective towards carbon dioxide transport and the membrane shows no deterioration after 30 days of continuous operation (abstract). Herman et al disclosed preparation of PVBTMAOH in scheme 1. Notice the counterion in changed from chloride to hydroxide by using a hydroxide containing reagent. It is within the skills of a person having ordinary skill in the art to replace the fluoride ion with

hydroxide ion. Therefore, PVBTAF meets all the structural limitations as stated in instant claims 11-13. A person having ordinary skill in the art would be motivated to place PVBTAOH in an alkaline fuel cell due to the membrane's high stability.

In regards to claim 15, Landsman et al teaches the porous substrate comprises of carbon paper, nickel or gold (3: 7-15). Both electrodes employ platinum as a catalyst (3: 30-65) as stated in instant claim 16.

Regarding claim 17, Landsman et al teaches the catalyst may comprise of platinum, gold, and silver. Since the porous substrate may comprise of gold, the catalyst layer is formed by the electronic conductive element.

As to claim 18, Landsman et al teaches the catalyst layer is supported by a mesh gold plated nickel screen (example 1, 6:1-5).

Regarding claim 19, Landsman et al was silent about the conductivity of the solid membrane. Studies performed by Herman et al shows the ionic conductivity of PVBTMAOH is around 0.01 S cm^{-1}. As known in the art, higher conductivity means less resistance which implies more current. A person having ordinary skill in the art would be motivated to use this membrane in a fuel cell in order to produce more electrical energy.

In regards to claim 20, Landsman et al teaches the catalyst layer is in between the matrix (3) and the electrodes (1, 2). See figure 1. Additionally, the matrix (3) comprises of a think porous sheet of electrically insulating material which holds the alkaline electrolyte (3: 1-3). Additionally, the electrodes are porous (3: 7-9). Therefore, the active layer is situated between a diffusion layer (electrode) and a membrane (porous insulating sheet).

4. Claim 14 is rejected under 35 U.S.C. 103(a) as being unpatentable over Landsman et al (US 5,480,735) and of Quinn et al (Journal of Membrane Science 131 1997 49-60) and Herman et al (Journal of Membrane Science 218 2003 147-163) as applied to claim 11 above, and in further view of Yokoyama et al (US 4,374,924).

The teachings of Landsman et al, Quinn et al, and Herman et al above are incorporated herein.

Yokoyama et al disclosed an antistatic layer comprising of a polymer (formula 1 in abstract). As known in the art, having a static material implies stationary charges. In electrical energy generation, electrons are produced and moved in order to produce current. Therefore, a person having ordinary skill in the art would be motivated to use this material to conduct ions in a fuel cell in order to produce electrical energy.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Alexander Chuang whose telephone number is (571)270-5122. The examiner can normally be reached on Monday to Thursday 8:30 AM - 5:00 PM EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Dah-Wei Yuan can be reached on (571)-272-1295. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

AC

/Dah-Wei D. Yuan/
Supervisory Patent Examiner, Art Unit 1795